REMARKS

Reconsideration of this application, based on the foregoing amendment and these remarks, is respectfully requested.

Claims 1 through 23 are now in this case. Claim 11 is amended in this paper. Claims 22 and 23 are added.

Claims 6 through 14, 18, and 19 are rejected under §101 as not directed to patentable subject matter. Specifically, the Examiner asserted that these claims fall within the judicial exception to statutory subject matter, in that they recite an algorithm that does not involve a physical transformation, and that does not produce a useful, concrete, tangible result.[1]

Applicants respectfully traverse the §101 rejection of claim 6 and its dependent claims, and submit that claim 6 is clearly directed to patent eligible subject matter, as established by the operative decisions of the Court of Appeals for the Federal Circuit.[2] These decisions establish the proposition that "a mathematical algorithm may be an integral part of patentable subject matter such as a machine or process if the claimed invention as a whole is applied in a 'useful' manner."[3]

The particular method claims found to be directed to patent eligible subject matter in its *Arrhythmia* and *AT&T* decisions are especially instructive. The independent method claim at issue in the *Arrhythmia* case read:

> 1. A method for analyzing electrocardiograph signals to determine the presence or absence of a predetermined level of high frequency energy in the late QRS signal, comprising the steps of:
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> converting a series of QRS signals to time segments, each segment having a digital value equivalent to the analog value of said signals at said time;

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[1] Office Action of January 30, 2007, page 3, *citing Interim Guidelines on Patent Eligible Subject Matter* (MPEP §2106).

[2] *Arrhythmia Research Technology Inc. v. Corazonix Corp.*, 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992); *In re Alappat*, 33 F.3d 1526, 31 USPQ2d 1545 (Fed. Cir. 1994); *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998); *AT&T Corp. v. Excel Communications Inc.*, 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999).

[3] *AT&T, supra*, USPQ at 1451.

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applying a portion of said time segments in reverse time order to high pass filter means;

determining an arithmetic value of the amplitude of the output of said filter; and

comparing said value with said predetermined level.[4]

This claim was found to be directed to statutory subject matter because, in answering the question "What did the applicant invent?", the court found that this invention was "properly viewed as a method of analyzing electrocardiograph signals in order to determine a specified heart activity," and thus is limited to a statutory process.[5] The number produced by the claimed method was "a number which had specific meaning – a useful, concrete, tangible result – not a mathematical abstraction".[6] In the *AT&T* case, the method claim at issue read:

> A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:
>
> *generating a message record for an interexchange call* between an originating subscriber and a terminating subscriber, and *including, in said message record, a primary interexchange carrier (PIC) indicator* having a value which is *a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one* of said interexchange carriers.[7]

This claim was found to not fall within the judicially created "mathematical algorithm" exception to statutory subject matter because the claim is directed to "a process that uses the Boolean principle in order to determine the value of the PIC indicator", which is a "useful, non-abstract result that facilitates differential billing of long-distance calls", and does not pre-empt other uses of the mathematical principle.[8]

Claim 6 is strikingly similar to the claims at issue in these two cases. The method of this claim is expressly recited, in its preamble, as being a method "for wavelet analysis of one or more time domain reflectometry (TDR) signals to determine one or more characteristics of one or more anomalies in a wire". It is not a method that is an abstraction, or that provides an

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[4] *Arrhythmia, supra,* USPQ at 1035.
[5] *Id.,* USPQ at 1038.
[6] *AT&T, supra,* USPQ at 1452 (discussing the holding of *Arrhythmia*).
[7] *AT&T, supra,* USPQ at 1449 (emphasis in original).
[8] *Id.,* USPQ at 1452.

abstract result. It is a method for analyzing a broken wire to find out what is wrong with it.[9] And the result of the method is an indication that the anomaly in the wire under analysis has a characteristic corresponding to a characteristic of a known anomaly. This method and its result is no more abstract than the claim found in the *Arrhythmia* case to be directed to statutory subject matter, which resulted in a "number which had specific meaning – a useful, concrete, tangible result" in the analysis of electrocardiograph signals to determine a specified heart activity.[10] The method of amended claim 6 and its result is no more abstract than the method claim in the *AT&T* case that resulted in the value of a "PIC indicator", which was found to be a "useful, non-abstract result that facilitates differential billing of long-distance calls" and that was found to be statutory subject matter because it did not pre-empt other uses of its underlying mathematical principle.[11]

The Examiner asserts that claim 6 is not directed to statutory subject matter because it does not provide a *final* result that is concrete, useful, and tangible.[12] In this regard, the Examiner asserts that claim 6 would provide such a *final* result, and would satisfy §101, if it were to include functional language in the final step that conveyed its result to a user: examples given by the Examiner of such functional language included:

> outputting/displaying the status, storing to do something, adjusting for providing useful manner, **indicating alarm/issuing alarm/alerting/reporting output information corresponding to the condition of the system/device,** calibrating for outputting data apply for controlling device/unit/ in a useful manner, etc.[13]

While the undersigned appreciates this suggestion, the law does not require such functional language, nor does the law require a claim to provide any particular *final* result, in order to be directed to statutory subject matter. The method claim in the *Arrhythmia* case provides no such functional language regarding its final result; its final step is "comparing said value with said predetermined level".[14] The method claim in the *AT&T* case provides no such functional language regarding its final result; its final step concludes with "including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of

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[9] *See also* specification, *supra,* page 7, line 18 through page 8, line 6; page 8, line 21 through page 9, line 12.
[10] *Arrhythmia, supra,* USPQ at 1038; *AT&T, supra,* USPQ at 1452 (discussing the holding of *Arrhythmia*).
[11] *Id.,* USPQ at 1452.
[12] Office Action, *supra,* page 3.
[13] *Id.* (emphasis in original).
[14] *Arrhythmia, supra.*

whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers".[15] Presumably, under the Examiner's analysis, each of these claims would fall within the judicial exception to §101; in each case, the Court of Appeals for the Federal Circuit concluded otherwise. The Examiner's position is therefore not supported under the law, and is therefore in error.

Applicants therefore respectfully traverse the §101 rejection of claim 6 and its dependent claims.

Claim 22 is added to more completely cover all aspects of Applicants' invention. New claim 22 now includes the step of "communicating results indicating that the anomaly in the wire has one or more particular known characteristics of one or more particular known anomalies corresponding to the one or more particular reference wavelet analysis results". The specification clearly supports this additional step,[16] and as such no new matter is presented.

Assuming *arguendo* that the Examiner's requirement of functional language is supported by the law, Applicants submit that the further limitation of new claim 22 meets that requirement. For this additional reason, Applicants submit that new claim 22 is further directed to statutory subject matter.

Independent claim 11 and its dependent claims were also rejected under §101 as not directed to patentable subject matter. Specifically, the Examiner asserted that these claims also fell within the judicial exception to statutory subject matter, in that they recite an algorithm that does not involve a physical transformation, and that does not produce a useful, concrete, tangible result.[17]

Claim 11 is amended for clarity, by striking its last paragraph, which was arguably duplicative of the additional limitation presented in its dependent claim 19.

For the reasons discussed above relative to claim 6, Applicants traverse the §101 rejection of claim 11 and its dependent claims. In this regard, the law provides that there is no

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[15] *AT&T, supra.*
[16] Specification of S.N. 10/749,416, page 11, lines 3 through 6.
[17] Office Action of January 30, 2007, page 3, *citing Interim Guidelines on Patent Eligible Subject Matter* (MPEP §2106).

difference between method and apparatus claims, for purposes of analysis regarding the judicial exception to §101.[18]

In summary, Applicants submit that amended claim 11 is directed to statutory subject matter in the same manner as is claim 6. Claim 11 does not purport to claim software that pre-empts a mathematical algorithm, or the mathematical principle of wavelet analysis. Rather, claim 11 is directed to software that uses wavelet analysis "to determine one or more characteristics of one or more anomalies in a wire". As in claim 6, the software of claim 11 and its result is no more abstract than was the invention in the *Arrhythmia* case, which was found to be directed to statutory subject matter,[19] and no more abstract than the invention in the *AT&T* case, which was also found to be statutory subject matter that did not pre-empt other uses of its underlying mathematical principle.[20]

Furthermore, Applicants submit that the Examiner's requirement of functional language directed to a *final* result is not required under the decisions of the Court of Appeals for the Federal Circuit, and that indeed the claims found by the Federal Circuit to comply with §101 would not comply with the Examiner's requirement. The Examiner's test for statutory subject matter is therefore in error.

Applicants therefore respectfully submit that amended claim 11 and its dependent claims are directed to statutory subject matter, and traverse the §101 rejection of these claims.

Similarly as discussed above relative to claim 22, new claim 23 is added to more completely cover all aspects of Applicants' invention. New claim 23 now recites that the software is further operable, when executed, to "communicate results indicating that the anomaly in the wire has one or more particular known characteristics of one or more particular known anomalies corresponding to the one or more particular reference wavelet analysis results". The specification clearly supports this additional step,[21] and as such no new matter is presented.

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[18] *See AT&T, supra,* USPQ at 1451 ("Whether stated implicitly or explicitly, we consider the scope of Section 101 to be the same regardless of the form – machine or process – in which a particular claim is drafted.").
[19] *Arrhythmia, supra,* USPQ at 1038; *AT&T, supra,* USPQ at 1452 (discussing the holding of *Arrhythmia*).
[20] *Id.,* USPQ at 1452.
[21] Specification of S.N. 10/749,416, page 11, lines 3 through 6.

And again assuming *arguendo* that the Examiner's requirement of functional language is supported by the law, Applicants submit that the further limitation of new claim 23 meets that requirement. For this additional reason, Applicants submit that new claim 23 is further directed to statutory subject matter.

Claims 1 through 4, 6 through 9, 11 through 13, and 15 through 21 stand rejected under §102(e) as anticipated by the Bechhoefer et al. reference[22]. Claims 5, 10, and 14 stand rejected under §103 as unpatentable over the Bechhoefer et al. reference.

With a previous response, Applicants had submitted a Declaration Under Rule 131 (the "Wills Declaration"), executed by Kendall Scott Wills, one of the named inventors in this application. Applicants have urged that the Wills Declaration establishes, with reference to numerous pages of an engineering notebook prepared by Applicant Dockins, the conception and reduction to practice of this invention from a time at least as early as May 12, 2003, which is the effective date of the Bechhoefer et al. reference.

The Examiner found, in the current Office Action, that the Wills Declaration was insufficient to overcome the reference. The Examiner apparently found that the steps[23] of accessing a library and comparing the wavelet analysis result are not "anticipated" by the Wills Declaration, such that the facts of the Wills Declaration are not commensurate with the scope of the claims.[24]

It is unclear from the Office Action exactly what the Wills Declaration lacks. Does the Wills Declaration fail to show conception of the claimed invention? Does the Wills Declaration fail to show that the invention was reduced to practice? The Office Action is not clear in this regard. The undersigned will address the alleged shortfall in the Wills Declaration as best he is able, by clarifying how its contents establish that Applicants' invention was made before the effective date of the Bechhoefer et al. reference.

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[22] U.S. Patent Publication No. 2004/0230282, published November 18, 2004, on an application filed May 12, 2003 by Bechhoefer et al.
[23] Referring, for example, to claim 6.
[24] Office Action, *supra,* page 2.

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Applicants submit that the contents of the Wills Declaration, particularly its Exhibit A, show that the claimed subject matter was conceived and reduced to practice by Applicants prior to the effective date of the reference, with respect to claim 6, by way of example. Applicants submit that this showing, relative to claim 6, will similarly establish the conception and reduction to practice of the other independent claims in this case.

Exhibit A shows, in its pages 15, 40, 59, and 61 through 65, the concept of a library of one or more reference wavelet analysis results that each correspond to one or more known anomalies having one or more known characteristics. Specifically, page 15 describes the concept of "comparative TDR" which "uses multiple TDR waveforms of objects with known circuit features & compares to waveform of unknown circuit features", and that "similarities and differences provide information about the unknown waveforms associated circuitry". Page 40 describes that wavelet transforms provide the additional benefit, in this context, of allowing time and frequency resolution to change based on the frequencies being examined; page 59 confirms that wavelet analysis "can be used to help highlight the differences" between devices to improve comparative TDR, because "the high frequencies, which are associated with the changes of the waveform, can be compared between units to determine if they exhibit similar changes".

Page 64 shows an example of a "library of one or more reference wavelet analysis results that each correspond to one or more known anomalies having one or more known characteristics", as recited in the claims. The example of this library shown on page 64 consists of a failure that has no die, labeled as "Reference Package (no die)", and also a non-failing unit, labeled as "Reference Package (known good)".

Page 61 describes that wavelet analysis was used on a series of TDR waveforms acquired for comparative TDR, including from a unit that had a failure at its "bump-to-die" interface that recovered after electrical stress. The wavelet analysis of these TDR waveforms corresponds to the steps of receiving a TDR signal and calculating a wavelet analysis result from that TDR signal, recited in claim 6. Page 64 shows the comparing of the wavelet analysis results for such a unit (U3) with those reference wavelet analysis results in the library, corresponding to the comparing step of claim 6. Specifically, the wavelet analysis results of unit U3 both before ("Pre-stress") and after ("Post-stress") recovery from its failure are compared with the wavelet

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analysis results in the library, including "Reference Package (no die)", and also a non-failing unit, labeled as "Reference Package (known good)". And as shown on page 64, this comparing was successful, in that the wavelet analysis of the failure before recovery ("U3 Pre-stress") matches that of the "Reference Package (no die)". In addition, the wavelet analysis of the recovered failure ("U3 Post-stress") matches that of the "Reference Package (known good)". Based on this successful experiment, Applicants realized, as stated on page 65, that these results can be used to differentiate among TDR waveforms, and can help to find characteristics of the waveforms.

Accordingly, Applicants submit that the Wills Declaration, including its Exhibit A, does indeed establish facts regarding the conception and reduction to practice of their invention, to an extent commensurate with the scope of the independent claims in this application. Therefore, given this further clarification of the content of Exhibit A to the Wills declaration, Applicants again respectfully submit that the Wills Declaration, as corroborated by the Declaration of Susie Collins, establish that Applicants conceived and reduced to practice the invention of independent claims 1, 6, 11, 15, and 16 prior to the effective date of the Bechhoefer et al. reference. Accordingly, Applicants submit that the Bechhoefer et al. reference is not prior art against the claims now in this case.

And because the prior art rejections in this case are all based on the application of the Bechhoefer et al. reference against the claims, Applicants submit that the prior art rejections are obviated because the Bechhoefer et al. reference is not prior art against the claims in this case. Withdrawal of the §102 and §103 rejections of claims 1 through 21 is respectfully requested.

For these reasons, Applicants respectfully submit that all claims now in this case are in condition for allowance. Reconsideration of this application is respectfully requested.

Respectfully submitted,

/Rodney M. Anderson/

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